Claims

What is claimed is:

1. A method of automatically labeling a time axis of a graph comprising the steps of:

generating time labels by processing input data that includes time based data;

creating a multi-level data structure;

storing the time labels in the multi-level data structure;

processing the multi-level data structure to refine the time labels;

generating multi-level time labels from the time labels that are stored in the multi-level data structure; and

labeling the time axis of a graph with multi-level time labels.

2. The method of automatically labeling a time axis of a graph according to claim 1 further comprising the step of assigning indexes to each of the time labels in the multi-level data structure.

3. The method of automatically labeling a time axis of a graph according to claim 1 further comprising the steps of:

generating axis markers; and

labeling the time axis of the graph with the axis markers.

4. The method of automatically labeling a time axis of a graph according to claim 1 further comprising the step of assigning indexes to each of the time labels in the multi-level data structure.

5. The method of automatically labeling a time axis of a graph according to claim 1 whereas the step of generating time labels comprises the steps of:

(a) creating an initial set of time labels;

(b) determining whether the initial set of time labels will fit along the time axis and if the initial set of time labels fits along the time axis proceeding to step (g);

(c) creating an abbreviated set of time labels;

(d) determining whether the abbreviated set of time labels will fit along the time axis and if the abbreviated set of time labels fits along the time axis proceeding to step (g);

(e) creating a subset of time labels;

(f) determining whether the subset of time labels will fit along the time axis and if the subset of time labels does not fit along the time axis proceeding to step (c); and

(g) generating the set of time labels.

6. The method of automatically labeling a time axis of a graph according to claim 5 whereas the step of determining whether the initial set of time labels will fit along the time axis comprises:

summing the length of each time label in the initial set of time labels and an inter-label spacing constant; and

comparing the sum with the length of the time axis.

7. The method of automatically labeling a time axis of a graph according to claim 5 whereas the step of determining whether the abbreviated set of time labels will fit along the time axis comprises:

summing the length of each time label in the abbreviated set of time labels and an inter-label spacing constant; and

comparing the sum with the length of the time axis.

8. The method of automatically labeling a time axis of a graph according to claim 5 whereas the step of determining whether the subset of time labels will fit along the time axis comprises:

summing the length of each time label in the subset of time labels and an inter-label spacing constant; and

comparing the sum with the length of the time axis.

9. The method of automatically labeling a time axis of a graph according to claim 1 whereas the step of processing the multi-level data structure to refine the time labels comprises extending the precision of the time labels.

10. The method of automatically labeling a time axis of a graph according to claim 1 whereas the step of processing the multi-level data structure to refine the time labels comprises merging the levels in the multi-level data structure.

11. A method of automatically labeling a time axis of a graph comprising:

generating time labels;

generating a multi-level data structure to store the time labels;

populating the multi-level data structure with the time labels;

refining the time labels in the multi-level data structure;

defining axis markers that will be displayed on the time axis; and

labeling the time axis with the time labels and the axis markers.

12. The method of automatically labeling a time axis of a graph according to claim 11 whereas the time labels are multi-level time labels.

13. A system for performing a method of automatically labeling a time axis of a graph comprising:

a processor operable to execute computer program instructions; and

a memory operable to store computer program instructions executable by the processor, for performing the steps of:

generating time labels by processing input data that includes time based data;

creating a multi-level data structure;

storing the time labels in the multi-level data structure;

processing the multi-level data structure to refine the time labels;

generating multi-level time labels from the time labels that are stored in the multi-level data structure; and

labeling the time axis of a graph with multi-level time labels.

14. The method of automatically labeling a time axis of a graph according to claim 13 further comprising the step of assigning indexes to each of the time labels in the multi-level data structure.

15. The method of automatically labeling a time axis of a graph according to claim 13 further comprising the steps of:

generating axis markers; and

labeling the time axis of the graph with the axis markers.

16. The method of automatically labeling a time axis of a graph according to claim 13 further comprising the step of:

assigning indexes to each of the time labels in the multi-level data structure.

17. The method of automatically labeling a time axis of a graph according to claim 13 whereas the step of generating time labels comprises the steps of:

(a) creating an initial set of time labels;

(b) determining whether the initial set of time labels will fit along the time axis and if the initial set of time labels fits along the time axis proceeding to step (g);

(c) creating an abbreviated set of time labels;

(d) determining whether the abbreviated set of time labels will fit along the time axis and if the abbreviated set of time labels fits along the time axis proceeding to step (g);

(e) creating a subset of time labels;

(f) determining whether the subset of time labels will fit along the time axis and if the subset of time labels does not fit along the time axis proceeding to step (c); and

(g) generating the set of time labels.

18. The method of automatically labeling a time axis of a graph according to claim 17 whereas the step of determining whether the initial set of time labels will fit along the time axis comprises:

summing the length of each time label in the initial set of time labels and an inter-label spacing constant; and

comparing the sum with the length of the time axis.

19. The method of automatically labeling a time axis of a graph according to claim 17 whereas the step of determining whether the abbreviated set of time labels will fit along the time axis comprises:

summing the length of each time label in the abbreviated set of time labels and an inter-label spacing constant; and

comparing the sum with the length of the time axis.

20. The method of automatically labeling a time axis of a graph according to claim 17 whereas the step of determining whether the subset of time labels will fit along the time axis comprises:

summing the length of each time label in the subset of time labels and an inter-label spacing constant; and

comparing the sum with the length of the time axis.

21. The method of automatically labeling a time axis of a graph according to claim 13 whereas the step of processing the multi-level data structure to refine the time labels comprises extending the precision of the time labels.

22. The method of automatically labeling a time axis of a graph according to claim 13 whereas the step of processing the multi-level data structure to refine the time labels comprises merging the levels in the multi-level data structure.

23. A computer program product for performing a method of automatically labeling a time axis of a graph process in a system, comprising:

a computer readable medium; and

computer program instructions, recorded on the computer readable medium, executable by a processor, for performing the steps of:

generating time labels by processing input data that includes time based data;

creating a multi-level data structure;

storing the time labels in the multi-level data structure;

processing the multi-level data structure to refine the time labels;

generating multi-level time labels from the time labels that are stored in the multi-level data structure; and

labeling the time axis of a graph with multi-level time labels

24. The method of automatically labeling a time axis of a graph according to claim 23 further comprising the step of assigning indexes to each of the time labels in the multi-level data structure.

25. The method of automatically labeling a time axis of a graph according to claim 23 further comprising the steps of:

generating axis markers; and

labeling the time axis of the graph with the axis markers.

26. The method of automatically labeling a time axis of a graph according to claim 23 further comprising the step of:

assigning indexes to each of the time labels in the multi-level data structure.

27. The method of automatically labeling a time axis of a graph according to claim 23 whereas the step of generating time labels comprises the steps of:

(a) creating an initial set of time labels;

(b) determining whether the initial set of time labels will fit along the time axis and if the initial set of time labels fits along the time axis proceeding to step (g);

(c) creating an abbreviated set of time labels;

(d) determining whether the abbreviated set of time labels will fit along the time axis and if the abbreviated set of time labels fits along the time axis proceeding to step (g);

(e) creating a subset of time labels;

(f) determining whether the subset of time labels will fit along the time axis and if the subset of time labels does not fit along the time axis proceeding to step (c); and

(g) generating the set of time labels.

28. The method of automatically labeling a time axis of a graph according to claim 27 whereas the step of determining whether the initial set of time labels will fit along the time axis comprises:

summing the length of each time label in the initial set of time labels and an inter-label spacing constant; and

comparing the sum with the length of the time axis.

29. The method of automatically labeling a time axis of a graph according to claim 27 whereas the step of determining whether the abbreviated set of time labels will fit along the time axis comprises:

summing the length of each time label in the abbreviated set of time labels and an inter-label spacing constant; and

comparing the sum with the length of the time axis.

30. The method of automatically labeling a time axis of a graph according to claim 27 whereas the step of determining whether the subset of time labels will fit along the time axis comprises:

summing the length of each time label in the subset of time labels and an inter-label spacing constant; and

comparing the sum with the length of the time axis.

31. The method of automatically labeling a time axis of a graph according to claim 23 whereas the step of processing the multi-level data structure to refine the time labels comprises extending the precision of the time labels.

32. The method of automatically labeling a time axis of a graph according to claim 23 whereas the step of processing the multi-level data structure to refine the time labels comprises merging the levels in the multi-level data structure.